SYNOPSIS

SYNTHESIS AND SPECTRAL STUDIES OF NOVEL HETEROCYCLIC METAL CHELATES OF SOME TRANSITION METAL IONS AND ITS BIOLOGICAL SIGNIFICANCE

SHORT RESUME OF THE PLAN PROPOSED FOR INVESTIGATION FOR Ph.D. DEGREE UNDER THE FACULTY OF SCIENCE

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Synthesis and Spectral Studies of Novel Heterocyclic Metal Chelates of Some Transition Metal ions and its Biological significance

INTRODUCTION:

The field of synthesis of heterocyclic compounds has long been represented as special problem for chemist. The chemistry of heterocyclic compounds and methods for synthesis forms the back bone of modern medicinal, chemical and pharmaceutical research. A heterocyclic compound with nitrogen of different ring sizes with different substitution pattern is the important class in the search of bioactivity. The bridgehead nitrogen,oxygen heterocyclicis important class of heterocyclic compounds.

The main aspect of concerning formation of heterocyclic metal complexes between pharmaceutical substance and various ligands are supported by several observations such as their wide use in medicines, agrochemicals, antiviral, antiulcer, antibacterial, antifungal, antileprotic and immune suppressive agents. According to biological, physiological andpathophysiological role of metal ion and ligand with pharmacological effect, metal ion present has great importance in carrying out the vital functions of living organisms. It also acts as a complexes and chelating agents. The new formed heterocyclic ligands and their complexes can be used as antimicrobial and antifungal agent that can be detected.

The use of ligand, chelating agent or complexes in medicines and biology concerns several purposes such as antidotes in poisoning with metal ions or hydrocyanic acid or cyanides.

In this work our plan is to synthesize the various heterocyclic ligands and heterocyclic metal complexes containing more reactive functional group. These metal complexes and ligands separately tested for antimicrobial and corrosion inhibition aspects.

LITERATURE SURVEY:

- Sharaddha Rani Gupta Reported synthesis of two new Schiffs bases ferrocenecarboxaldehydefuroylhydrazone and ferrocenecarboxaldehydepropanoylhydrazone have been synthesized and characterized by elemental analysis, electronic, IR and NMR spectroscopy.
- Anukajal et.al. Reported the synthesis of 4[(thiophene-2 yl) methylene amino] phenyl sulphonamideSchiffs bases: a versatile pharmacophore.

- Vitthal M. Gugwad et.al. Reported antimicrobial and spectral studies of zinc metal complexes derived from Imidazo[4,5-F][1,10] phenanthroline derivatives.
- VR Rajewar et.al. Reported preparation characterization and biological evalution of inner transition metal complexes derived from heterocyclic schiffs bases.

OBJECTIVES -

- To synthesize few new heterocyclic ligands.
- Coordination or linkage in heterocyclic ligand with metals.
- To synthesize of Novel heterocyclic metal complexes.
- Synthesis of few more new chelating agents and heterocyclic chelate complexes.
- To search the Antibacterial activity of above synthesized ligands and their metal chelates.
- To developed new synthetic method for synthesize various heterocyclic metal complexes.
- To study the applications of synthesized heterocyclic metal complex such as Antibacterial, antifungal, antiviral etc.
- To characterize the synthesized heterocyclic metal complexes by spectral analysis.

METHODOLOGY TO BE USED:

- To synthesize of 4-oxa 2-phenyl 4H quinazoline 3 carboxylic acid(4 methyl phenyl) amide and 2 phenyl 4H 3,1 benzoxacin-4-one using novel method.
- Similarly synthesized 4-oxa 2-phenyl 4Hquinazoline 3 carboxylic acid (4 methyl phenyl) amide and 2 phenyl 4H 3, 1 benzoxacin-4-one acts as heterocyclic ligands and nucleophilically coordinated with metal ion to form heterocyclic metal ion complexes.
- The synthesized heterocyclic ligands can be characterized by using UV, Visible, IR and NMR spectroscopy
- The synthesized heterocyclic ligands to be tested as a Lewis base and coordinate with various metal ions to forms complexes.
- To study the Biological activities of above synthesized complexes.
- To study the antimicrobial activities of complexes, their stabilities and corrosion inhibition aspects.

INTERNATIONAL STATUS:

Since from the last three decades, we have witnessed the revolutionary synthesis of Heterocyclic metal complexes of many researchers throughout the World. Although there huge number of articles on Heterocyclic ligands and metal complexes.

- V.S.Sastri[1] and J.R Perumareddi[2] Corrosion Vol. 53: Issue 8: Pages 617-622 August 1997 Molecular Orbital Theoretical studies of some organic corrosion inhibitor.
- I Lukovits, E Kalman, FabrizioZucchi Corrosion 57(1), 3-8, 2001 Corrosion inhibitor correlation between electronic structure and efficiency.
- MamdouhAdly Hassan, Maghrabi Ali Seleem, Ahmed Mohamed MosallemYounes, Europian journal of chemistry 4(2),121-123,2013 Synthesis and Spectral Charactrisation of some heterocyclic nitrogen compounds.
- Layla Ali Mohammed, RaheemTahir Mehdi Abid Allah Mohammed Ali,Nano Biomed Eng. 10(3), 199-212,2018 Synthesis and Biological screening of the Gold complexe as Anticancer and some Transition metal complexes with New heterocyclic ligands derived from 4 amino Antipyrine.
- MA Hassan, MA Seleem, AMM YounesEuropian journal of chemistry 4(2) 121-123, 2013 Synthesis and spectral charactriastion of some heterocyclic nitrogen compound.

NATIONAL STATUS:

Apart from the international contribution some of the Indian researcher has also made their contribution on the synthesis of heterocyclic ligands and heterocyclic metal complexes.

- Vinod P Singh, Pooja Singh, Ashish K Singh Inorganica chemical Acta 379(1), 56-63, 2011 Synthesis, structural and corrosion inhibition studies on cobalt (II), Nickel (II), Copper (II) and Zinc(II) aomplexes with 2 Acetyl thiophene benzoyl hydrazone.
- Jyoti C Ajbani, D smitaRavankar, M Revansiddappa, V Swamy, S Shankar Int J chemsci 13, 1673-1692, 2015 Microwave synthesis, spectroscopic, thermal and biological studies of some transition metal complexes containing heterocyclic ligand.
- AnuKajal, SumanBala, Sunil Kamboj, Neha Sharma, VipinSainiJournal of catalyst 2013, 2013 Schiffs bases: a versatile pharmacophore.
- Shrsddha rani Gupta[a], Punita Mourya[b], M.M. Singh[b], Vinod P Singh[a] , Journal of Organometallic chemistry 767, 136-143, 2014 Synthesis, Structural, electrochemical and corrosion inhibition properties of two new ferrocene Schiffs bases derived from hydrazides.

- Dileep Kumar Yadav, Mumtaz Ahmed Quraishi Industrial and engineering research 51(46), 14966-14979, 2012 Application of some condensed Uracils as corrosion inhibitor for mild steel gravimetric, electrochemical, surface morphological UV, visible and theoretical investigation.

REGIONAL STATUS:

- Suraj B Ade, M.N Deshpande, H.H Deshmukh:Rasayan J Chem 5, 10-15, 2012; Synthesis and characterization of transition metal complexes of schiffs base derived from isatian and 2 – amino 4-chloro benzoic acid;
- VR RajewarNanded 2015 Preparation charactrisation and biological evaluation of inner transition metal complexes derived from heterocyclic schiffs bases.
- KavitaLaxmanraokendreNanded 2015, Synthesis and charactrisation of some lanthanoid complexes derived from heterocycles.
- Sarika M. Jadhav[a], Vinod A. Shelke[a], Sunil G. Shankarwar[a], Achut S. Munde[b], Trimbak K Chondhekar[a], Journal of Saudi chemical Society 18(1), 24-34, 2014 Synthesis, Spectral, Thermal, Potentiometric and Antimicrobial studies of transition metal complexes of tridentate ligand.
- Vitthal M. Gugwad[1], Yogesh J. Yadav[2], Parashuram A. Jadhav[2] and Dr. Anil A. Ghanwat[*1] 2017 Antimicrobial and spectral studies of zinc metal complexes derived from Imidazo[4,5-F][1,10] phenanthroline derivatives.
- Manisha Gupta, PavanMethur Ray J Butcher Inorganic Chemistry 40(5), 878-885, 2001, Crystal structure, spectral studies and catechol oxidase activity of trigonalbipyramidalCu (II) complexes derived from a tetradentatediamidebisbenzimidazole ligand.

SCOPE OF THE STUDY:

A lot of research work is going on all over the world to investigate the new organic heterocyclic metal complexes which will acts as effective medicine as anticancer, anti HIV, antituberculostatic, antimicrobial drug. The national institute of Health, National cancer institute Bethesda Maryland, U.S.A showed the keen interest in the evolution of metal complex compounds.

Hopefully the synthesized metal complexes will work as Antibacterial, antifungal, antiviral, anti- HIV, antituberculostic etc. and will have additive source of medicine.

PROPOSED WORK PLAN WITH TENTATIVE CHAPTER SCHEME:

Year	**Quarter(Periods of three Month)**	**Milestone**
Year I	First Quarter	Reference work
	Second Quarter	Topic first literature survey
	Third Quarter	Topic second Experimental work and characterization
	Fourth Quarter	Topic second Experimental work and characterization
Year II	First Quarter	Topic third Experimental work and characterization
	Second Quarter	Topic third Experimental work and characterization
	Third Quarter	Topic fourth Experimental work and characterization
	Fourth Quarter	Topic fourth Experimental work and characterization
Year III	First Quarter	Topic fifth Experimental work and characterization
	Second Quarter	Topic sixth Biological evaluation and corrosion study.
	Third Quarter	Topic sixth Biological evaluation and corrosion

		study.
	Fourth Quarter	Writing and typing of the research work and submission of the research work

EXPECTED OUTCOME:

It is planned to synthesize newly designed heterocyclic metal complexes and new heterocyclic ligands which are free from toxic effect and possesses good biological activity and Corrosion inhibition study of ligand and heterocyclic metal chelates.

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- Poojasingh, Ashish K singh, Vinod P singhPolyhedra 65, 73-81, 2013 Synthesis, Strutural and corrosion inhibition properties of some transition metal (II) complexes with O- hydroxyacetophenone-2-thiophenoyl hydrazone.
- I Lukovits, E Kalman, FabrizioZucchi corrosion 57 (1), 3-8, 2001 Corrosion inhibitor correlation between electronic structure and efficiency.
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- Abdul Amir H Kadhum, Abu BakarMohamad, Ahmed A Al-Amiery, Mohd S Takriff, Molecules 16(8), 6969-6984, 2011 Antimicrobial and Antioxidant activities of new metal complexes derived from 3 amino coumarin.
- K Veni, A- Dinesh karthi, K Geetha, D Shakila, IOSR Journal of pharmacy 62-68,2017 Green synthesis ,charactrisation, corrosion inhibition and biological application of schiffs base transition metal complexes.
- MA Ashraf, K Mahmood, A Wayid, MJ Maah IPCBEE 10,1-7,2011 Synthesis, Charactrisation and biological activity of Schiff bases.
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- Wail Al Zoubi, SaadGomaa Mohamed, Abbas Ali Salih Al- Hamadani, RSC advance 8(41), 23294-23318, 2018 Acyclic and cyclic imines and their metal complexes: recent progress in biomaterials and corrosion application.
- M Mesbah, T Douali F sahli, S Issaadi Journal of molecular structure 1151, 41-48, 2018 Synthesis, charactrisation, spectroscopic studies and antimicrobial activity of three new schiffs bases derived from heterocyclic moiety.
- Chandrabhanverma, Lukman O Olasunkanmi, Eno E Bbenso, M Ahmed Quarishi I Bassev The journal of physical chemistry 120(21), 11598-11611, 2016.

- Khalid J AlAdilee, HM Hesson J chem. Pharm Res 798),89-103,2015 Synthesis, identification, structural, studies and biological activity of some transition metal complexes with novel heterocycles azo schiffs bases ligand derivrd from benzimidazole.
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